

TRA – Torsional Ratchet Actuator UA05D1 Description

Designer(s): Sandia National Laboratories

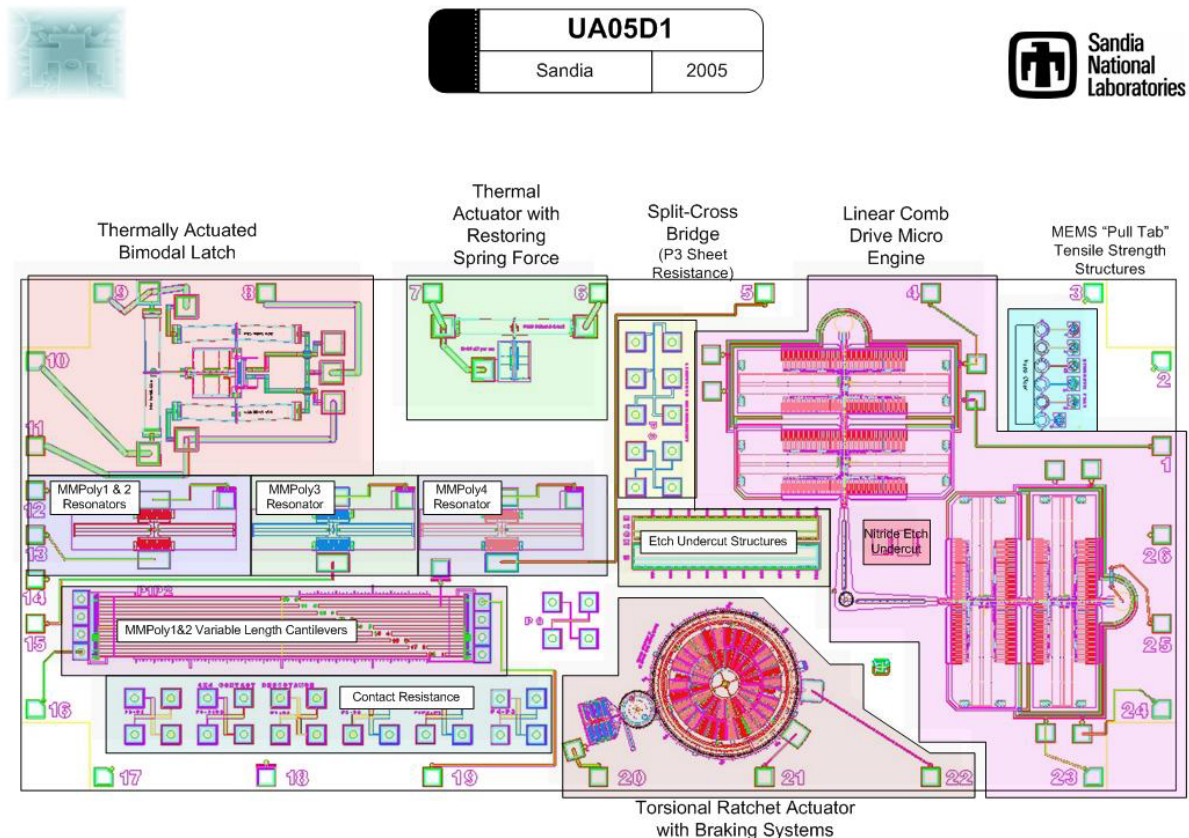
Organization: Sandia National Laboratories

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Part(s) Description

UA05D1- Torsional Ratchet Actuator with Braking System.

The TRA uses rotational comb drives for electrostatic operation. A large circular frame ties the movable banks of combs together. Four cantilever beams support this frame in its center and act as the frame's spring return. These four beams are stiff to any lateral motion of the frame but compliant to rotation. There are three ratchet pawls and three anti-reverse pawls located symmetrically round the ring gear. Four guides are used to maintain alignment of the ring gear, constraining motion along the x, y, and z planes. The TRA rotates the load gear which contains a toggle beam between the gear teeth that applies a tangential resisting force of $24\mu\text{N}$.



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Figure 1 Schematic of entire module, highlighting each device type.

SAMPLE Document

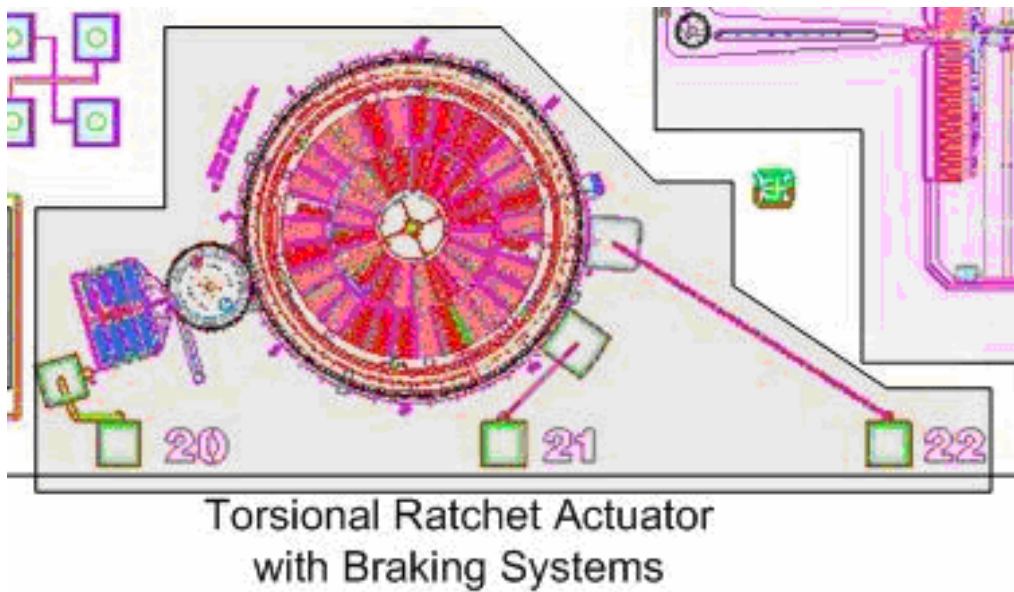


Figure 2 Blow up of the TRA with braking system.

Signal Input Table for each Device

Table 1 Signal input for the Torsional Ratchet Actuator with braking system shown in Figure 2.

Bond Pad Number	Input Signal Label	Input Signal Frequency	Input Voltage Peak to Peak	Waveform (Square, Sinusoidal, Saw Tooth....)	Other
Torsional Ratchet Actuator					
21	Ground	0	0	NA	
22	Input	<1Hz-100Hz	15-55V	Clipped Square	
TRA Brake					
21	Ground	0	0	NA	
20	Input	DC or square	15-55V	Clipped Square or DC	Variable to adjust brake pressure

Notes:

If you run the TRA much above 55V, the Comb Stops may break off and short out the combs.